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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/538,470

06/09/2005

Eiji Iwamura

TIP 036

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23408

7590

06/25/2009

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EXAMINER

MCCRACKEN, DANIEL

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

06/25/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

garycohn@seattlepatent.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/538,470	<b>Applicant(s)</b> IWAMURA, EIJI	
	<b>Examiner</b> DANIEL C. MCCracken	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 3/2/2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-8,10 and 11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8,10 and 11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

Citation to the Specification will be in the following format: (S. # : ¶/L) where # denotes the page number and ¶/L denotes the paragraph number or line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

### ***Status of Application***

Three responses or attempted responses to the non-final office action of 7/10/2008 have been received. Applicant's amendment of 1/12/2009 was non-compliant for the reasons noted in the Notice of Non-Compliant Amendment dated 1/22/2009. Applicants response of 2/23/2009 was received and accepted. Applicants filed a subsequent response dated 3/2/2009. Supplemental replies are not entered as a matter of right. *See* 37 CFR 1.111(a)(2). However, "[t]he Office may enter a supplemental reply if the supplemental reply is clearly limited to . . . (E) Correction of informalities (*e.g.*, typographical errors)." *Id.* The response filed 3/2/2009 appears to correct such informalities and as such, will be entered. Thus, for clarity in the record, this office action addresses the claims filed 3/2/2009 and the remarks of 2/23/2009.

Upon inspection, it would appear as if not all amendments to the most recent set of claims (3/2/2009) have been accounted for. For example, in the amendments submitted on 1/22/2009 (which were held non-compliant and not entered), Applicants delete "comprising a void present in" and insert "in the form of a film containing voids, wherein the film is of" language. In the amendment filed 2/23/2009, Applicants delete "material comprising a void" and

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insert “present in the form of a film containing voids, wherein the film is of” language. In the most recent amendment filed 3/2/2009, Applicants list Claim 2 as “previously presented.” Note however that this Claim 2 does not recite the “present in the form” language, instead reciting “material in the form.” At least in this situation, the differences in claim scope appear to be semantic, however this does raise issues to the propriety of the amendments and the status identifiers. As per MPEP 714 II. C. (E), the Examiner is waiving the requirement for proper status identifiers. That said, to facilitate examination and to ensure that all amendments are accounted for, the Applicant is respectfully requested to adopt the format of making amendments as detailed in MPEP 714 (status identifiers, indicating inserted language with underlines, deletions with brackets or strike-through, etc.).

### ***Response to Arguments***

#### **Drawings**

Applicants replacement drawings have been received and are accepted. The objection to the drawings is WITHDRAWN.

#### **Claim Rejections – 35 U.S.C. §102**

Applicants have traversed the rejections *en masse*, treating each reference versus each rejection. Note 37 C.F.R. 1.111(b) which states “[t]he reply by the applicant or patent owner must be reduced to a writing which distinctly and specifically points out the supposed errors in the examiner’s action and must reply to every ground of objection and rejection in the prior Office action.” As such, even though every ground of objection and rejection was not traversed,

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the Examiner responds to the arguments with respect to the claims as they were rejected. Those rejections mooted by cancellation are WITHDRAWN.

With respect to the rejection of Claims 1-5 and 7-10 under 35 U.S.C. 102(b) as being anticipated by US Statutory Invention Registration H1,924 to Zabinski, et al., Applicants traversal is on several grounds. With respect to the product claims (Claim 1-2, 7-8 and 10-11), Applicants traversal is on the ground that – succinctly stated – Zabinski does not teach the density with the particulars as now claimed. *See generally* (Remarks of 2/23/2009 at 5). The density limitation now present in Claim 1 and newly presented Claim 11 are features that were not present in the claims as filed. The claims define the invention. 35 U.S.C. 112, ¶2. As Claim 1 is now drawn to a different invention, the rejection of that claim is WITHDRAWN. That said, certain remarks were made that were not understood – specifically, the remarks that “Zabinski does not describe any film having a low density region in which the density is from 1.4 to 2.2 g/cm<sup>3</sup>” (Remarks of 2/23/2009 at 5), as well as the remarks related to the alleged density of diamond-like carbon appear to be directed towards a different set of claims. The remarks filed 3/2/2009 do not appear to address the density in terms of the “relative” way (i.e. “from 10 to 40%”) in which it was claimed. With respect to Claim 2, and notwithstanding the issues related to the various amendments noted *supra*, the changes to this claim appear to be semantic. Zabinski discloses amorphous carbon/metal composites with the claimed metals. *See* (Zabinski 3: 25-32). Note that Zabinski discloses films at *e.g.* (Zabinski 3: 62). The claims that depend from Claim 2 (Claims 7-8) do not appear to be traversed. Note that the atomic composition is taught at (Zabinski 5: 33-45) (“Table 1”) and that voids appear to be suggested by the process. With respect to Claim 5, Applicants traversal is on the grounds that “Zabinski does not teach or

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suggest preparing a hydrogen storage material in a gas phase synthesis, using a carbon containing pieces [*sic*] of a metal element.” (Remarks of 2/23/2009 at 5). This is not persuasive because Zabinski appears to teach a physical vapor deposition process (see generally Zabinski 3: 39 *et seq.*), which is what Applicants state on and for the record in their own Specification that the “gas phase synthesis” is. *See* (S. 7: 21-22) (“The gas phase synthesis used in the process for preparation of the present invention can be any physical vapor deposition (PVD) method.”).

With respect to the rejection of 1-2, 4 and 8-10 under 35 U.S.C. 102(b) as being anticipated by US 2001/0031346 to Iwamura, Applicant’s traversal is on the grounds that “the examiner is mistaken in correlating density with hardness.” (Remarks of 2/23/2009 at 6). Furthermore, Applicants state “[t]his multilayer structure is not at all similar to applicants’ claim 1 film, which has low density regions permeating through higher density regions within a single film layer.” *Id.* Inasmuch as this limitation was not claimed at the time the rejection was made, these arguments have no relevance as the rejections were tailored to a differently claimed invention. Applicants statement that “the examiner is mistaken in correlating density with hardness” is not persuasive. Note that “high hardness layers” and “low hardness layers” are not merely “carbon layers [that] would be expected to have the same densities, since both of them are made up of carbon.” *Id.* The low hardness carbon layer is one that “may contain one or more of, for example, Si, Ti, W, Co, and the like in an amount of up to about 20%.” (Iwamura 3: [0034]). Thus, the addition of a different element (which presumably affects hardness) changes the density of the layers. Note also that while Table 1 of Iwamura discloses different thicknesses, it also discloses embodiments wherein each layer is the same thickness (see e.g. Sample No. 15), which makes it clear that the densities can be different in light of the passage at (Iwamura 3:

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[0034]). All of that said, as Claim 1 now recites newly claimed features, the rejection of Claim 1 is WITHDRAWN. As to Claim 2, Applicant argues Iwamura does not disclose a film having voids. These would appear to be shown in any of the micrographs (Figs. 3-5). As no response to the rejection of Claims 8 and 10 was found in Applicant's response, no response is believed necessary.

With respect to the rejection of 1-4 and 7-10 under 35 U.S.C. 102(b) as being anticipated by Bauer, et al., *Mechanical properties and performance of magnetron-sputtered graded diamond-like carbon films with and without metal additions*, Diamond and Related Materials 2002; 11: 1139-1142, Applicants traversal is on the grounds that “Bauer does not teach or suggest any film having higher and low density regions as recited in applicant's claim 1.” (Remarks of 2/23/2009 at 7). This has been considered and is persuasive in light of Applicants amendment. The rejection of Claim 1 is WITHDRAWN. With respect to Claim 2, given that the same process (magnetron sputtering) and the same materials (carbon, Ti) are taught, it is expected that the resulting porous film is taught. *Compare e.g.* (Bauer at 1139) (magnetron sputtering) *with* (S. 8: 27) (magnetron sputtering). Thus, the arguments that Bauer does not teach pores is not persuasive. Applicants traverse rejections of Claim 5 and 6, but these claims were not rejected and as such, the arguments not understood.

#### Claim Rejections – 35 U.S.C. §103

With respect to the rejection of Claims 1-5 and 7-10 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Statutory Invention Registration H1,924 to Zabinski, et al., no arguments appear to be presented traversing

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the 102/103 rejection and any "hydrogen storage" properties. As such, no response is believed to be necessary.

With respect to the rejection of Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Statutory Invention Registration H1,924 to Zabinski, et al., Applicants traversal is on the ground that "Zabinski's discussion of densities (column 4) applies to his films as a whole; it does not state or suggest that his films have distinct regions of higher and lower density." (Remarks of 2/23/2009 at 5). This has been considered but is not persuasive. The relationships set forth at (Zabinski 4: 10-15) discuss deposition rates, which in turn can be arranged to express density as a function of time. As such, different densities in the film are readily optimized with the relationships at (Zabinski 4: 10-15) and well within the skill in the art.

With respect to the rejection of Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Statutory Invention Registration H1,924 to Zabinski, et al., Applicants traversal is on the grounds that "Zabinski does not teach or suggest the operating pressure specified in that claim." (Remarks of 2/23/2009 at 5). This of course was recognized in the rejection, which was made under 35 U.S.C. 103 and not 35 U.S.C. 102. Applicants present arguments, allegedly to show criticality of the pressure. These arguments can be succinctly restated as Claim 6 requires a pressure approximately six times that of the largest taught in Zabinski, and the pressures claimed are critical to the hydrogen storage. *See* (Remarks of 2/23/2009 at 5). Upon reconsideration, these arguments are persuasive. The rejection is WITHDRAWN.

With respect to the rejection of Claims 1-2, 4 and 8-10 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US 2001/0031346 to



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Iwamura, no arguments appear to be presented traversing the 102/103 rejection and any "hydrogen storage" properties. As such, no response is believed to be necessary.

All rejections (35 U.S.C. §§102-103) are updated below as necessary to address Applicants amendments.

### ***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 2, 5, 7-8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by US Statutory Invention Registration H1,924 to Zabinski, et al.

With respect to Claim 2, Zabinski teaches an amorphous carbon composite with the claimed metals. *See generally* (Zabinski 2: 60 *et seq*) (composites/"amorphous carbon"), (Zabinski 3: 25-32) (metals). As to Claims 7, note the composition limitations are taught at (Zabinski "Table 1"). As to Claims 8 and 10, given the substantial similarity in processes (magnetron sputtering), it is expected that the claimed properties (voids) are taught. *Compare e.g.* (Zabinski 3: 19) ("sputtering") *with* (S. 7: 23). Given the compositional makeup is taught, it is expected that any hydrogen storage capabilities or properties (to the extent they are to be given patentable weight) are necessarily taught. "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima

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facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

With respect to Claim 5, Zabinski teaches room temperatures (i.e. less than 773 K). Zabinski appears to recite the same magnetron supporting apparatus described at (S. 8: 25 *et seq.*) As such, Zabinski is being interpreted as “gas phase synthesis.”

Claims 2, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by US 2001/0031346 to Iwamura.

With respect to Claim 2, Iwamura recites amorphous carbon and titanium. (Iwamura 5: [0051]). As to Claim 7, the metal content is taught. (Iwamura 3: [0034]). As to Claim 8, voids are taught. (Iwamura “Figs.”). Given the compositional makeup is taught, it is expected that any hydrogen storage capabilities or properties (to the extent they are to be given patentable weight) are necessarily taught. “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

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Claims 2 and 7-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Bauer, et al., *Mechanical properties and performance of magnetron-sputtered graded diamond-like carbon films with and without metal additions*, Diamond and Related Materials 2002; 11: 1139-1142 (hereinafter “Bauer at \_\_\_”).

With respect to Claims 2, Bauer discloses amorphous carbon with titanium. (Bauer at 1140, col. 1). As to Claim 7, the compositions are taught. (Bauer at 1139, col. 2) (5 mol %). As to Claim 8, given the same process appears to have been employed (magnetron sputtering), it is expected that the claimed properties are taught.

Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by US 4,503,125 to Nelson.

With respect to Claim 6, Nelson teaches a sputtering process for depositing carbon and titanium containing films. *See generally* (Nelson 3: 60 *et seq*) (carbon and titanium). The sputtering process operates at 0.002 to 0.02 torr, *i.e.* greater than 1.33322 Pa (Nelson 4: 56 *et seq.*).

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Statutory Invention Registration H1,924 to Zabinski, et al. in view of US 5,753,387 to Takami, et al. to show a state of fact.

With respect to Claim 1, Zabinski teaches an amorphous carbon composite with the claimed metals. *See generally* (Zabinski 2: 60 *et seq*) (composites/"amorphous carbon"), (Zabinski 3: 25-32) (metals). As to the density limitation, note the discussion in column 4 of Zabinski that relates density as a function of deposition rate. Optimizing this (which is akin to changing the deposition rate) is well within the skill of the art. *See* MPEP 2144.05 regarding optimization of result-effective variables. As to Claim 11, notwithstanding the ambiguities noted *supra*, this claim appears to have a density that would read on amorphous carbon, taught by Zabinski. *See* (Takami 2: 55-60) ("wherein the carbonaceous material has a region of amorphous carbon structure and a region of graphite structure, and the carbonaceous material has a true density of 1.8 g/cm<sup>3</sup>") (note Takami is relied on for the density limitation only).

Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2001/0031346 to Iwamura . in view of US 5,753,387 to Takami, et al. to show a state of fact.

With respect to claim 1, Iwamura teaches the metal content. (Iwamura 3: [0034]). As to the density limitation, note the discussion of the different thicknesses of the different high hardness and low layers. (Iwamura "Table 1"). The hardness is apparently a function of the composition of the material, which would in turn necessarily affect the density of each layer. (Iwamura 3: [0034]). Altering both the composition (to affect hardness) and ergo density is well within skill in the art, as demonstrated by Iwamura. *See* MPEP 2144.05 regarding optimization

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of result-effective variables. As to Claim 11, notwithstanding the ambiguities noted *supra*, appears to have a density that would read on amorphous carbon, taught by Iwamura. *See* (Takami 2: 55-60) (“wherein the carbonaceous material has a region of amorphous carbon structure and a region of graphite structure, and the carbonaceous material has a true density of 1.8 g/cm<sup>3</sup>”) (note Takami is relied on for the density limitation only).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL C. MCCracken whose telephone number is (571)272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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